REMARKS

The present application had claims 1-10 pending. Claims 1 and 5 have been amended herein, claims 4 and 6-10 have been canceled, and new claims 11-19 have been added. Accordingly, claims 1-3, 5 and 11-19 are presently pending.

Initially, Applicants wish to inform the Examiner that the corresponding European application has been granted as EP 1721355 (a copy of which is enclosed). As can be seen in the granted patent, EP 1721355 has the same claim set as the claim set presented in the present amendment.

In the August 5, 2010 Office Action, the Examiner objected to the specification because of some informalities and also suggested the use of section headings. Applicants have herein amended the specification to overcome the Examiner's objections and have added appropriate section headings.

The Examiner also rejected claims 5, 6, 9 and 10 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite or incomplete. Applicants have herein amended claim 5 and replaced claims 6, 9 and 10 in an effort to overcome the Examiner's rejection. The criticized phrases in claims 5 and 6 have been deleted and not repeated in replacement claims 11-16. With respect to claims 9 and 10, replacement claims 18 and 19 now include the steps suggested by the Examiner.

Claims 1-3 and 5-8 were also rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over EP 1 229 600 (hereafter EP `600) in view of Imahashi et al. (US 5,350,643); Claim 4 was rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over EP `600 in view of Imahashi and further in view of Koehler et al. (US 6,844,286); and Claims 9-10 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over EP `600 in view of Imahashi and further in view of Iwase et al.

(6,245,453).

Applicants respectfully disagree with the Examiner's positions. The present invention provides membrane-electrode units (MEUs) for membrane fuel cells which have improved performance when operated with unhumidified operating gases, i.e., in dry operating conditions (see e.g., the specification, page 6, lines 1-9). Such improved MEUs do not require external humidifiers (see page 4, lines 19-21, of the specification) and enable a shorter start-up time for the fuel cell (see the specification, page 7, lines 30-33).

The EP `600 and Imahashi (US 5,359,643) references were cited in the PCT Written Opinion of the corresponding PCT application and were explicitly considered during prosecution of the corresponding European application - granted patent EP 1721355.

EP `600 discloses MEUs, in which the gas permeability of the cathode gas diffusion layer (GDL) is 1.2 to 2 times higher of the gas permeability of the anode GDL. Imahashi discloses MEUs wherein the water repellency of the hydrogen catalyst layer is higher than the water repellency of the oxygen electrode catalyst layer (see e.g., claim 1). Furthermore, Imahashi discloses that the porosity of the cathode catalyst layer may be higher than the porosity of the anode catalyst layer (see e.g., claim 7).

In the terminology of the Imahashi patent, the hydrogen gas diffusion electrode (2 in the figures) consists of catalyst layer (6) and gas diffusion layers (7), and the oxygen gas diffusion electrode (3) consists of catalyst layer (8) and gas diffusion layer (9) (see Imahashi, Figure 2 and column 3, lines 57-66).

The different values of water repellency in Imahashi are obtained by modifying catalyst layers (6) and (8) (see Imahashi, column 4, lines 50-53, and claim 1). Similarly,

the difference in porosity is also obtained by modifying the anode and cathode catalyst layers (see Imahashi, example 3, column 8, lines 28-47).

The GDLs used in Imahashi are standard materials, such as carbon paper (see Imahashi, column 3, line 66-68 and examples 1 and 3). Additionally, there are no microlayers present in the GDLs, as required by the pending claims of the present application, as amended herein.

Contrary to the teachings of the Imahashi reference, in the present invention the difference in pore volume and the difference in the amount of water repellent agent (WRA) is always referring to the gas diffusion layers, *not to the catalyst layers* (see claim 1 of the present application). The anode and cathode GDLs are modified pursuant to the present invention while the catalyst layers/electrode layers are not considered.

Combining the teachings of EP `600 and Imahashi does not meet the limitations set forth in the claims of the present application, as amended herein. At best, combining EP `600 and Imahashi would provide a MEU wherein the gas permeability of the cathode GDL is 1.2 to 2 times higher than the gas permeability of the anode GDL and wherein the anode and cathode catalyst layers have different water repellencies. Neither reference, nor their combination, teaches that the amounts of water repellent agent in the anode and cathode GDLs are in the range of 20 to 35% by weight and that the amount of water repellent agent in the anode GDL is identical or higher than the amount of water repellent agent in the cathode GDL. Additionally, these references do not teach the use of a microlayer with a thickness between 10 and 20 microns in the GDLs.

Furthermore, neither EP `600 nor Imahashi (nor any combination thereof) teach or suggest the unexpected advantages associated with the present invention; that is, fuel cell operation with non-humidified gases or dry operating conditions, or the shorter start-up times for fuel cells of the present invention.

In sum, a skilled artisan in the art field would not arrive at the presently claimed invention based on the teachings of these cited references, either alone or in combination. Moreover, none of the other cited references, either alone or in combination, solve the shortcomings of the EP `600 and Imahashi references.

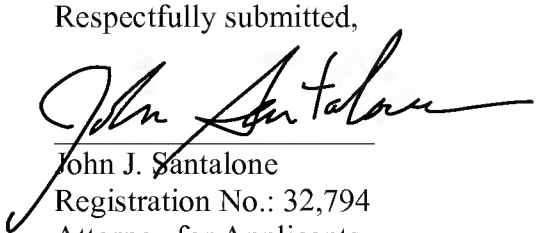
The remaining pending claims of the present application all dependent from, and contain all the limitations of, independent claim 1, and thus are patentable over the cited references for the same reasons as outlined above.

In light of the amendments and remarks above, Applicants request reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a) set forth in the August 5, 2010 Office Action and respectfully solicit allowance of the present application.

No fee is believed to be required in connection with the filing of this response, other than the fee for the requested three-month extension of time. If any fee is deemed necessary, authorization is hereby given to charge the amount of any such fee to Deposit Account No. 50-5371.

If the Examiner has any questions regarding the present application, the Examiner is cordially invited to contact Applicants' attorney at the telephone number provided below.

Respectfully submitted,



John J. Santalone
Registration No.: 32,794
Attorney for Applicants
Telephone No.: (914) 873-1956